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Inheritance

An Introduction

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Relationship Types

- Composition
  - "has-a" relationship
  - *e.g.* X has a Y
- Inheritance
  - "is-a" relationship
  - *e.g.* X is a Y

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Relationship Examples

- A rectangle — width and height
- A rectangle — area
- A square — rectangle
- A rectangle — polygon
- A polygon — 2D shape

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Relationship Examples

- A rectangle has-a width and height
- A rectangle has-a area
- A square is-a rectangle
- A rectangle is-a polygon
- A polygon is-a 2D shape

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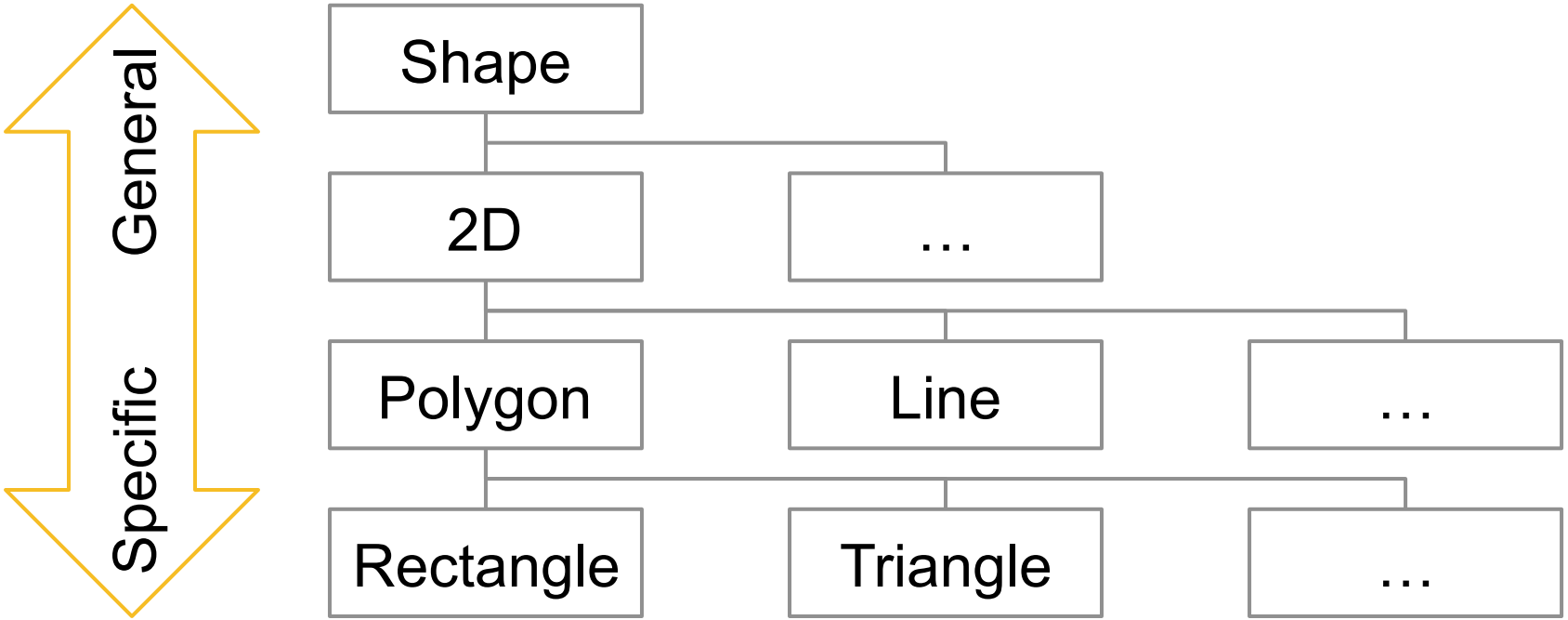
Inheritance Hierarchy



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Terminology

Rectangle is-a Polygon is-a 2D is-a Shape

- Rectangle is a **child class** of Polygon
- Polygon is a **child class** of 2D
- Rectangle **inherits from** Polygon which **inherits from** 2D which **inherits from** Shape

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Access

Rectangle extends Polygon extends 2D extends Shape

- Rectangle may not access private methods or members in Polygon or 2D or Shape
- Rectangle may access public or protected methods or members in Polygon, 2D, and Shape

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Behavior

Rectangle extends Polygon extends 2D extends Shape

- Rectangle may override methods in Polygon (use the @Override annotation)
- Rectangle may add additional methods not already defined in Polygon

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Behavior

Rectangle extends Polygon extends 2D extends Shape

- Rectangle may explicitly call the constructor for Polygon using the super() method
- Chain constructors so Rectangle calls Polygon constructor, which calls 2D which calls Shape constructor

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Behavior

Rectangle extends Polygon extends 2D extends Shape

- Rectangle eventually inherits from the Object class (explicitly or implicitly)
- Rectangle inherits default toString() and other methods from the Object class

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